

What is claimed is:

1. A developer charging unit comprising:
  - a developer charging member for charging developer bore by
  - 5 a developer bearing member by abutting against said developer bearing member;
  - a supporting member for supporting said developer charging member; and
  - a plurality of fixing portions for fixing said developer
  - 10 charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement, wherein a spacing between two of said fixing portions located in a central section in a longitudinal direction of said developer charging member is shorter than a spacing between two
  - 15 of said fixing portions located at an end section in said longitudinal direction of said developer charging member.
2. A developer charging unit according to claim 1, wherein:
  - the closer said fixing portions are located to a center in
  - 20 said longitudinal direction of said developer charging member, the shorter the spacing between two of said fixing portions becomes.
3. A developer charging unit comprising:
  - 25 a developer charging member for charging developer bore by a developer bearing member by abutting against said developer bearing member;
  - a supporting member for supporting said developer charging member; and
  - 30 a plurality of fixing portions for fixing said developer

charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement,

wherein a distance between a free end of said developer charging member and one of said fixing portions located in a central section in a longitudinal direction of said developer charging member is shorter than a distance between said free end of said developer charging member and one of said fixing portions located at an end section in said longitudinal direction of said developer charging member.

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4. A developer charging unit according to claim 3, wherein: the closer a fixing portion is located to a center in said longitudinal direction of said developer charging member, the shorter the distance between said free end of said developer charging member and that fixing portion becomes.

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5. A developer charging unit comprising:

a developer charging member for charging developer bore by a developer bearing member by abutting against said developer bearing member;

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a supporting member for supporting said developer charging member; and

a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement,

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wherein a number of said fixing portions located in a central section in a longitudinal direction of said developer charging member is larger than a number of said fixing portions located at an end section in said longitudinal direction of said developer charging member.

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6. A developer charging unit according to claim 5, wherein:  
the closer said fixing portions are located to a center in  
said longitudinal direction of said developer charging member,  
5 the larger the number of said fixing portions becomes.

7. A developer charging unit according to claim 1, wherein said  
developer charging member and said supporting member are fixed  
together by welding.

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8. A developer charging unit according to claim 7, wherein said  
welding is laser welding.

9. A developer charging unit according to claim 1, wherein:  
15 said developer charging member includes

an elastic body that is capable of abutting  
against a surface of said developer bearing member,  
and

an elastic-body-supporting member for  
20 supporting said elastic body; and

said elastic-body-supporting member and said supporting  
member are fixed together.

10. A developer charging unit according to claim 1, wherein a  
25 screw hole for fixing said supporting member to a developing device  
is provided at each end section of said supporting member in said  
longitudinal direction thereof.

11. A developer charging unit comprising:  
30 a developer charging member for charging developer bore by

a developer bearing member by abutting against said developer bearing member;

a supporting member for supporting said developer charging member; and

5 a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement, wherein:

10 a spacing between two of said fixing portions located in a central section in a longitudinal direction of said developer charging member is shorter than a spacing between two of said fixing portions located at an end section in said longitudinal direction of said developer charging member;

15 the closer said fixing portions are located to a center in said longitudinal direction of said developer charging member, the shorter the spacing between two of said fixing portions becomes;

said developer charging member and said supporting member are fixed together by laser welding;

20 said developer charging member includes

an elastic body that is capable of abutting against a surface of said developer bearing member, and

25 an elastic-body-supporting member for supporting said elastic body;

said elastic-body-supporting member and said supporting member are fixed together; and

30 a screw hole for fixing said supporting member to a developing device is provided at each end section of said supporting member in said longitudinal direction thereof.

12. A developer charging unit comprising:

a developer charging member for charging developer bore by  
a developer bearing member by abutting against said developer  
5 bearing member;

a supporting member for supporting said developer charging  
member; and

a plurality of fixing portions for fixing said developer  
charging member and said supporting member together, said fixing  
10 portions being lined up according to a predetermined arrangement,  
wherein:

a distance between a free end of said developer charging  
member and one of said fixing portions located in a central section  
in a longitudinal direction of said developer charging member is  
15 shorter than a distance between said free end of said developer  
charging member and one of said fixing portions located at an end  
section in said longitudinal direction of said developer charging  
member;

the closer a fixing portion is located to a center in said  
20 longitudinal direction of said developer charging member, the  
shorter the distance between said free end of said developer  
charging member and that fixing portion becomes;

said developer charging member and said supporting member  
are fixed together by laser welding;

25 said developer charging member includes

an elastic body that is capable of abutting  
against a surface of said developer bearing member,  
and

an elastic-body-supporting member for  
30 supporting said elastic body;

said elastic-body-supporting member and said supporting member are fixed together; and

a screw hole for fixing said supporting member to a developing device is provided at each end section of said supporting member in said longitudinal direction thereof.

13. A developer charging unit comprising:

a developer charging member for charging developer bore by a developer bearing member by abutting against said developer bearing member;

a supporting member for supporting said developer charging member; and

a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement, wherein:

a number of said fixing portions located in a central section in a longitudinal direction of said developer charging member is larger than a number of said fixing portions located at an end section in said longitudinal direction of said developer charging member;

the closer said fixing portions are located to a center in said longitudinal direction of said developer charging member, the larger the number of said fixing portions becomes;

said developer charging member and said supporting member are fixed together by laser welding;

said developer charging member includes

an elastic body that is capable of abutting against a surface of said developer bearing member, and

an elastic-body-supporting member for  
supporting said elastic body;

said elastic-body-supporting member and said supporting  
member are fixed together; and

5 a screw hole for fixing said supporting member to a  
developing device is provided at each end section of said  
supporting member in said longitudinal direction thereof.

14. A developing device comprising:

10 a developer bearing member for bearing developer; and  
a developer charging unit according to claim 1,

wherein a latent image bore by an image bearing member is  
developed using said developer bore by said developer bearing  
member and charged by said developer charging member provided in  
15 said developer charging unit.

15. An image-forming apparatus comprising:

an image bearing member for bearing a latent image;  
a developer bearing member for bearing developer; and  
20 a developer charging unit according to claim 1,

wherein a latent image bore by said image bearing member  
is developed using said developer bore by said developer bearing  
member and charged by said developer charging member provided in  
said developer charging unit.

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16. A computer system comprising:

a computer unit;  
a display device that can be connected to said computer unit;  
and

30 an image-forming apparatus that can be connected to said

computer unit and that includes: an image bearing member for bearing a latent image; a developer bearing member for bearing developer; and a developer charging unit according to claim 1, wherein a latent image bore by said image bearing member is developed using said developer bore by said developer bearing member and charged by said developer charging member provided in said developer charging unit.

17. A developer charging unit comprising:  
10 a developer charging member for charging developer bore by a developer bearing member;  
a supporting member for supporting said developer charging member; and  
a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement,  
15 wherein a distance between a free end of said developer charging member and one of said fixing portions located at an end section in a longitudinal direction of said developer charging member is longer than a distance between said free end of said developer charging member and one of said fixing portions located in a central section in said longitudinal direction of said developer charging member.

25 18. A developer charging unit according to claim 17, wherein:  
a spacing between two of said fixing portions located at the end section in said longitudinal direction of said developer charging member is wider than a spacing between two of said fixing portions located in the central section in said longitudinal direction of said developer charging member.  
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19. A developer charging unit according to claim 17, wherein said developer charging member and said supporting member are fixed together by welding.

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20. A developer charging unit according to claim 19, wherein said welding is laser welding.

21. A developing device comprising:

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a developer bearing member for bearing developer;  
a developer charging unit including

a developer charging member for charging said  
developer bore by said developer bearing member;

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a supporting member for supporting said  
developer charging member; and

a plurality of fixing portions for fixing said  
developer charging member and said supporting member  
together, said fixing portions being lined up  
according to a predetermined arrangement,

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wherein a latent image bore by an image bearing member is  
developed using said developer bore by said developer bearing  
member, and

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wherein a distance between a free end of said developer  
charging member and one of said fixing portions located at an end  
section in a longitudinal direction of said developer charging  
member is longer than a distance between said free end of said  
developer charging member and one of said fixing portions located  
in a central section in said longitudinal direction of said  
developer charging member.

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22. A developing device according to claim 21, wherein:

a spacing between two of said fixing portions located at the end section in said longitudinal direction of said developer charging member is wider than a spacing between two of said fixing portions located in the central section in said longitudinal direction of said developer charging member.

23. A developing device according to claim 21, wherein said developer charging member and said supporting member are fixed together by welding.

24. A developing device according to claim 23, wherein said welding is laser welding.

25. A developing device according to claim 21, wherein a sealing member for preventing said developer from spilling is provided at said end section in said longitudinal direction of said developer charging member.

26. A developing device according to claim 25, wherein:  
said developer charging member includes

an elastic body that is capable of abutting against a surface of said developer bearing member, and

an elastic-body-supporting member for supporting said elastic body; and  
said sealing member is fixed to said elastic-body-supporting member.

27. A developing device according to claim 26, wherein a

thickness of said sealing member is thicker than a thickness of said elastic body.

28. A developing device according to claim 27, wherein:

- 5        said elastic body and said sealing member are fixed to said elastic-body-supporting member next to each other; and  
      said elastic body and said sealing member abut against the surface of said developer bearing member.

10 29. A developing device comprising:

- a developer bearing member for bearing developer;  
      a developer charging unit including

          a developer charging member for charging said developer bore by said developer bearing member;

- 15        a supporting member for supporting said developer charging member; and

          a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up

- 20        according to a predetermined arrangement, wherein:

      a latent image bore by an image bearing member is developed using said developer bore by said developer bearing member;

- a distance between a free end of said developer charging member and one of said fixing portions located at an end section  
25 in a longitudinal direction of said developer charging member is longer than a distance between said free end of said developer charging member and one of said fixing portions located in a central section in said longitudinal direction of said developer charging member;

- 30        a spacing between two of said fixing portions located at

the end section in said longitudinal direction of said developer charging member is wider than a spacing between two of said fixing portions located in the central section in said longitudinal direction of said developer charging member;

5        said developer charging member and said supporting member are fixed together by laser welding;

        a sealing member for preventing said developer from spilling is provided at said end section in said longitudinal direction of said developer charging member;

10        said developer charging member includes

                an elastic body that is capable of abutting against a surface of said developer bearing member, and

                an elastic-body-supporting member for supporting said elastic body;

        a thickness of said sealing member is thicker than a thickness of said elastic body;

        said elastic body and said sealing member are fixed to said elastic-body-supporting member next to each other; and

20        said elastic body and said sealing member abut against the surface of said developer bearing member.

30.    An image-forming apparatus comprising:

        an image bearing member for bearing a latent image;

25        a developer bearing member for bearing developer; and

        a developer charging unit including

                a developer charging member for charging developer bore by said developer bearing member;

                a supporting member for supporting said developer charging member; and

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a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up according to a predetermined arrangement, wherein:

5       a latent image bore by said image bearing member is developed using said developer bore by said developer bearing member; and  
a distance between a free end of said developer charging member and one of said fixing portions located at an end section in a longitudinal direction of said developer charging member is  
10 longer than a distance between said free end of said developer charging member and one of said fixing portions located in a central section in said longitudinal direction of said developer charging member.

15   31.   A computer system comprising:

a computer unit;

a display device that can be connected to said computer unit;

and

an image-forming apparatus that can be connected to said  
20 computer unit and that includes:

an image bearing member for bearing a latent image;

a developer bearing member for bearing developer; and

a developer charging unit including

25       a developer charging member for charging developer bore by said developer bearing member;

a supporting member for supporting said developer charging member; and

30       a plurality of fixing portions for fixing said developer charging member and said supporting member together, said fixing portions being lined up

according to a predetermined arrangement, wherein:

a latent image bore by said image bearing member is developed using said developer bore by said developer bearing member; and

5 a distance between a free end of said developer charging member and one of said fixing portions located at an end section in a longitudinal direction of said developer charging member is longer than a distance between said free end of said developer charging member and one of said fixing  
10 portions located in a central section in said longitudinal direction of said developer charging member.

32. A developing device comprising:

a housing that has an opening and that is capable of  
15 containing developer;

a developer bearing member for bearing said developer, said developer bearing member being arranged to front on said opening;

a developer charging member for charging said developer bore by said developer bearing member; and

20 a sealing member for preventing said developer from spilling out from between said housing and a circumferential surface of said developer bearing member at an end section in an axial direction of said developer bearing member,

said housing further including a pressing portion for  
25 pressing said developer charging member towards said developer bearing member,

wherein a pressing force caused by said pressing portion and exerted on an end section, in said axial direction of said developer bearing member, of said developer charging member  
30 becomes smaller from an end in said axial direction towards a

center of said developer bearing member.

33. A developing device according to claim 32, wherein a second  
sealing member is provided between said pressing portion and said  
5 developer charging member, said second sealing member being  
provided for preventing said developer from spilling out from  
between said pressing portion and said developer charging member.

34. A developing device according to claim 33, wherein a spacing  
10 between said pressing portion and said developer charging member  
becomes wider from the end towards the center in said axial  
direction of said developer bearing member.

35. A developing device according to claim 34, wherein said  
15 pressing portion has a protruding portion protruding towards said  
developer charging member at an end, in said axial direction of  
said developer bearing member, of said pressing portion.

36. A developing device according to claim 35, wherein said  
20 protruding portion presses said sealing member through said  
second sealing member.

37. A developing device according to claim 35, wherein said  
pressing portion has an inclined surface between said protruding  
25 portion and a non-protruding portion of said pressing portion.

38. A developing device according to claim 32, wherein:  
said developer charging member includes  
an abutting member that is made to abut against  
30 said developer bearing member, and

an impelling member for impelling said abutting member;

said abutting member and said sealing member are fixed to said impelling member next to each other; and

5       said abutting member and said sealing member abut against a surface of said developer bearing member.

39. A developing device comprising:

10       a housing that has an opening and that is capable of containing developer;

      a developer bearing member for bearing said developer, said developer bearing member being arranged to front on said opening;

      a developer charging member for charging said developer bore by said developer bearing member; and

15       a sealing member for preventing said developer from spilling out from between said housing and a circumferential surface of said developer bearing member at an end section in an axial direction of said developer bearing member,

20       said housing further including a pressing portion for pressing said developer charging member towards said developer bearing member, wherein:

25       a pressing force caused by said pressing portion and exerted on an end section, in said axial direction of said developer bearing member, of said developer charging member becomes smaller from an end in said axial direction towards a center of said developer bearing member;

30       a second sealing member is provided between said pressing portion and said developer charging member, said second sealing member being provided for preventing said developer from spilling out from between said pressing portion and said developer charging



member;

a spacing between said pressing portion and said developer charging member becomes wider from the end towards the center in said axial direction of said developer bearing member;

5       said pressing portion has a protruding portion protruding towards said developer charging member at an end, in said axial direction of said developer bearing member, of said pressing portion;

10       said protruding portion presses said sealing member through said second sealing member;

      said pressing portion has an inclined surface between said protruding portion and a non-protruding portion of said pressing portion;

15       said developer charging member includes  
          an abutting member that is made to abut against  
          said developer bearing member, and  
          an impelling member for impelling said abutting member;

20       said abutting member and said sealing member are fixed to said impelling member next to each other; and

      said abutting member and said sealing member abut against a surface of said developer bearing member.

40.   An image-forming apparatus comprising:

25       a developing device including:

          a housing that has an opening and that is capable of containing developer;

30       a developer bearing member for bearing said developer, said developer bearing member being arranged to front on said opening;

a developer charging member for charging said developer bore by said developer bearing member; and

a sealing member for preventing said developer from spilling out from between said housing and a circumferential surface of said developer bearing member at an end section in an axial direction of said developer bearing member,

said housing further including a pressing portion for pressing said developer charging member towards said developer bearing member,

wherein a pressing force caused by said pressing portion and exerted on an end section, in said axial direction of said developer bearing member, of said developer charging member becomes smaller from an end in said axial direction towards a center of said developer bearing member.

41. A computer system comprising:

a computer unit;

a display device that can be connected to said computer unit;

and

an image-forming apparatus that can be connected to said computer unit and that includes:

a developing device including:

a housing that has an opening and that is capable of containing developer;

a developer bearing member for bearing said developer, said developer bearing member being arranged to front on said opening;

a developer charging member for charging said developer bore by said developer bearing member; and

a sealing member for preventing said developer from spilling out from between said housing and a circumferential surface of said developer bearing member at an end section in an axial direction of said developer bearing member,

said housing further including a pressing portion for pressing said developer charging member towards said developer bearing member,

wherein a pressing force caused by said pressing portion and exerted on an end section, in said axial direction of said developer bearing member, of said developer charging member becomes smaller from an end in said axial direction towards a center of said developer bearing member.

42. A developing device comprising:

a developer bearing member for bearding developer, said developer bearing member having a rotation shaft and being capable of rotating about said rotation shaft;

a shaft bearing member for receiving said rotation shaft of said developer bearing member; and

a thickness restricting unit having a thickness restricting member for restricting a thickness of a layer of said developer bore by said developer bearing member,

wherein the position of said thickness restricting unit is determined by said shaft bearing member.

43. A developing device according to claim 42, wherein said thickness restricting member abuts against said developer bearing member to restrict the thickness of the layer of said developer

bore by said developer bearing member.

44. A developing device according to claim 42, wherein:  
said thickness restricting unit has a hole;  
5 said shaft bearing member has a protrusion;  
and the position of said thickness restricting unit is  
determined by fitting said protrusion into said hole.

45. A developing device according to claim 44, wherein:  
10 said thickness restricting unit has a plurality of holes;  
said shaft bearing member has a plurality of protrusions;  
each of said protrusions is fit into a corresponding one  
of said holes; and  
a first protrusion among said plurality of protrusions has  
15 a shaft bearing hole for receiving said rotation shaft.

46. A developing device according to claim 45, wherein, among  
said plurality of holes, a first hole into which said first  
protrusion is fit has a circular shape.

20 47. A developing device according to claim 46, wherein said  
first protrusion is fit together with said first hole.

48. A developing device according to claim 45, wherein:  
25 a second protrusion that is different from said first  
protrusion is fit into a second hole that is different from said  
first hole; and

a direction from a center of said first hole towards a center  
of said second hole intersects a direction of a counterforce that  
30 said thickness restricting member receives from said developer

bearing member by abutting against said developer bearing member.

49. A developing device according to claim 45, wherein:

5 a second protrusion that is different from said first protrusion is fit into a second hole that is different from said first hole;

said second protrusion abuts against said second hole at two sections; and

10 a direction of a line that passes through said two sections is parallel to a direction of a counterforce that said thickness restricting member receives from said developer bearing member by abutting against said developer bearing member.

50. A developing device according to claim 44, further comprising a housing capable of containing said developer,

15 wherein said protrusion is fit into said hole across said housing.

51. A developing device comprising:

20 a developer bearing member for bearding developer, said developer bearing member having a rotation shaft and being capable of rotating about said rotation shaft;

a shaft bearing member for receiving said rotation shaft of said developer bearing member; and

25 a thickness restricting unit having a thickness restricting member for restricting a thickness of a layer of said developer bore by said developer bearing member by abutting against said developer bearing member, wherein:

30 said thickness restricting unit has a plurality of holes; said shaft bearing member has a plurality of protrusions;

the position of said thickness restricting unit is determined by said shaft bearing member by fitting each of said protrusions into a corresponding one of said holes;

a first protrusion among said plurality of protrusions has  
5 a shaft bearing hole for receiving said rotation shaft;

among said plurality of holes, a first hole into which said first protrusion is fit has a circular shape;

said first protrusion is fit together with said first hole;

a second protrusion that is different from said first  
10 protrusion is fit into a second hole that is different from said first hole;

a direction from a center of said first hole towards a center of said second hole intersects a direction of a counterforce that said thickness restricting member receives from said developer bearing member by abutting against said developer bearing member;  
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said second protrusion abuts against said second hole at two sections;

a direction of a line that passes through said two sections is parallel to a direction of a counterforce that said thickness restricting member receives from said developer bearing member by abutting against said developer bearing member;  
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said developing device further comprises a housing capable of containing said developer; and

said protrusions are fit into said holes across said  
25 housing.

52. An image-forming apparatus comprising:

a developing device including:

a developer bearing member for bearding  
30 developer, said developer bearing member having a

rotation shaft and being capable of rotating about said rotation shaft;

a shaft bearing member for receiving said rotation shaft of said developer bearing member; and

5 a thickness restricting unit having a thickness restricting member for restricting a thickness of a layer of said developer bore by said developer bearing member,

wherein the position of said thickness restricting unit is  
10 determined by said shaft bearing member.

53. A computer system comprising:

a computer unit;

a display device that can be connected to said computer unit;

15 and

an image-forming apparatus that can be connected to said computer unit and that includes:

a developing device including:

20 a developer bearing member for bearding developer, said developer bearing member having a rotation shaft and being capable of rotating about said rotation shaft;

a shaft bearing member for receiving said rotation shaft of said developer bearing member; and

25 a thickness restricting unit having a thickness restricting member for restricting a thickness of a layer of said developer bore by said developer bearing member,

wherein the position of said thickness restricting  
30 unit is determined by said shaft bearing member.